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Even here, the symbol becomes rather cumbersome, and this is the simplest case of a double relationship.

ARTHUR E. BOSTWICK

SCIENTIFIC BOOKS

Magnetism and Electricity. By BROOKS and POYSER. Longmans, Green and Co. Pp. vii + 633; 413 illustrations.

This volume is intended by the authors to replace Poyser's "Advanced Magnetism and Electricity" as the latter book had become out of date owing to the enormous progress made in electrical theory during the last twenty years. The subject-matter is presented in experimental form; practically every point treated theoretically is illustrated by one or more experiments. The method is admirable, especially for a text in physics; as the authors state in the preface, it is important that a beginner should learn to recognize that all theory is based upon a groundwork of experimental fact. The book treats all of the subjects usually found in a text on electricity and magnetism and the treatment is very well done in most cases. The authors' emphasis upon the student's comprehension of the significance of the lines of force of the electric and magnetic field we think well worth while; the more the student is made to understand Faraday's ideas in regard to the electric and magnetic fields the better prepared he will be to understand the operation of instruments and machines.

The modern conception of the electric current as the flow of electrons is used in the book and its use is undoubtedly justified at this time, by the results obtained from the experiments of various researchers along this line. A chapter is devoted to the discharge of electricity through gases; in the discussion use is made of the latest theories in regard to this phenomenon. The chapters on Dynamos and Motors and on Alternating Currents are entirely inadequate to be of much service to the student. We think they should have either been omitted altogether or else treated more comprehensively. Any adequate treatment of dynamos and motors requires a deal of space

and should not be attempted in such an elementary text.

A carefully selected list of problems is given at the end of each chapter and it adds much to the value of the book as a text. On the whole we think this text to be as well suited for teaching purposes as any that has recently come to our attention.

J. H. MORECROFT

COLUMBIA UNIVERSITY

The Life of the Plant. By C. A. TIMIRIAZEFF. Translated from the revised and corrected seventh Russian edition by ANNA CHEREMETEFF. New York, Longmans, Green, and Co. 1912. Pp. 355 with 80 text-figures. \$2.50.

It is a great pity that this admirable popular presentation of the status of plant physiology might not have appeared in English some twenty-five years ago. Originally published in 1878 and passing through seven editions it can not but strike one familiar with the current literature as being distinctly behind the times, in spite of the evident effort to incorporate various modern investigations. For the specialist the translation has been too long delayed, and even for the general reader there are many views which should be modified in order to give as accurate as possible a notion of what the plant really does. On the other hand, it must be confessed that Professor Timiriazeff has presented the subject in such an attractive form that its very readableness is a strong point in favor of the book. Few of those who have any interest in botany whatever but that will enjoy reading "The Life of the Plant" and the great number of apt illustrations and demonstrations makes one wish that numerous American audiences might have had the opportunity of listening to such a course of lectures thirty-five years ago. The popular conception of a botanist would certainly be higher.

The book is neither a text-book nor a special treatise, but a simple account of the more fundamental life processes of the plant told in a way calculated to make them interesting if not "popular." For this reason it is

hardly necessary to take it up page by page, as is so often done with volumes intended for students, and point out various slips, typographical and otherwise. The author disclaims any idea of expressing the whole truth, but feels the obligation of saying nothing but the truth. This limitation, not always felt by writers of popular works on botany, may be responsible for some of the omissions noted.

After a particularly good discussion of the relation of botanical science to society, one chapter each is devoted to the cell, the seed, the root, the leaf, the stem, growth, the flower, plants and animals and the origin of organic form. This latter chapter is distinctly pro-Darwin; in fact, there is little if any reference to the recent work along this line and the whole discussion smacks strongly of *Zweckmässigkeit*. The reason for adding as an appendix a lecture delivered in 1875 on the plant as a source of energy is not manifest. Unfortunately there is no index.

G. T. M.

The Toxicity of Caffein: an Experimental Study on Different Species of Animals.

By WILLIAM SALANT and J. B. RIEGER.

Bureau of Chemistry, Bulletin 148, pp. 98.

The Elimination of Caffein: an Experimental Study on Herbivora and Carnivora.

By WILLIAM SALANT and J. B. RIEGER. Bureau of Chemistry Bulletin 157, pp. 23.

One can not help feeling, on looking through these two bulletins filled with a wealth of detailed investigation on so important a drug as caffein, that the authors left no stone unturned in their quest for truth. So many experiments were made that their presentation in abstract form is extremely difficult. However, a few of the salient features can be briefly stated.

The principal object of the work described in the first paper seems to be the determination of the toxic and of the fatal dose of caffein for the rabbit, guinea-pig, cat and dog. Theoretically this is simple. But as the authors have shown, the toxicity of caffein, like that of any other drug, depends upon such conditions as the age of the animal, its diet,

the method of administering the drug, and still other factors which complicate the question of toxicity. Only after the most extensive investigation can all of the questions taken up in the bulletin be answered with any degree of certainty.

So strongly has the influence of diet, method of administration, etc., on the action of a drug been emphasized that one can not help wondering whether the toxic and fatal doses of caffein are really definite quantities for more than one set of experimental conditions. The conservatism of the authors, as exemplified in the following statement from page 91 of their bulletin, is certainly commendable: "... the most striking effect of caffein observed in the work herein reported was the comparatively wide range of variation in the resistance of individuals of the same species to this drug. This was found to be the case even when the conditions of experimentation were approximately uniform. . . ."

In their second bulletin the authors present their work on the elimination of caffein. They found that "Caffein administered subcutaneously, by mouth, or intravenously, is eliminated in part unchanged, in the urine, into the gastrointestinal canal, and into the bile. . . ."

Since the appearance of the above bulletins, at least two other pharmacological researches have been published which show how extremely careful the investigator must be before coming to final conclusions regarding the toxicity of a drug. In the *Proceedings of the Society for Experimental Biology and Medicine*¹ Kleiner and Meltzer describe some experiments on the reduction of the toxicity of strychnin by the simultaneous administration of large quantities of fluid. They state "that the toxicity of strychnin is definitely reduced not only when it is administered in great dilution, but also when saline or water is administered nearly simultaneously in other parts of the body, thus, perhaps, diluting the poison within the body. . . ."

Traube² states that the pharmacological ac-

¹ Vol. IX., p. 101, 1912.

² *Biochemische Ztschr.*, Bd. 42, p. 494, 1912.